TITLE
Replay appliance for recording media containing
information blocks

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FIELD OF THE INVENTION
The invention relates to a replay appliance for
recording media containing information blocks, having
means for access, at a defined playing time, to video
10   information on a Digital Versatile Disc, which is also
called a DVD, without a so-called DVD Video Title Set
Time Map Table.

BACKGROUND OF THE INVENTION
15   According to the DVD Specification for read-only discs,
Part 3, in Version 1.0, which contains the video
specification, a so-called DVD Video Title Set Time Map
Table is provided on the DVD disc, by means of which
can be accessed as a function of the playing time, in
20   order to replay a video sequence of a movie from a
desired playing start time. This table contains all the
necessary information and entry points to allow a
replay appliance to be used to directly access a video
sequence which corresponds to a specific replay time or
25   running duration or, for example, to start replaying a
movie which has been recorded on a DVD from a time
which corresponds to a predetermined playing time in
the film. If, for example, the first ten minutes of a
movie are skipped, then the Video Title Set Time Map
30   Table can be used to jump directly to the point in a
movie which corresponds to this replay time when viewed
continuously. Using the data contained in the Video
Title Set Time Map Table on the disc, the scanning
device in the replay appliance is driven directly to a
35   scanning point on the disc which contains the data
corresponding to a predetermined replay time.
The Video Title Set Time Map Table contains the
recording point for the video data in each program
chain in the video title for each time during replay.

However, it is only optional for this table to be provided on the disc, so that it is not generally available in the replay appliance for finding a recording point on the disc corresponding to a replay
5   time which can be predetermined.

SUMMARY OF THE INVENTION
The object of the invention is to provide a replay appliance for recording media containing information
10   blocks, which allows access, at a defined playing time, to video information on a DVD even without a DVD Video Title Set Time Map Table being recorded on the disc.

This object is achieved by means specified in
15   independent claims, and advantageous refinements and developments are specified in dependent claims.

One aspect of the invention is to allow access, at a defined playing time, to video information on a DVD,
20   despite there not being a DVD Video Title Set Time Map Table or the DVD Video Title Set Time Map Table being damaged.

According to the invention, means are provided in the
25   replay appliance, using which the recording medium is searched for a characteristic feature. It has been found that recording media having information blocks have so-called designators that are used, in an advantageous manner, to find so-called navigation
30   sectors on the disc. The sectors of the recording medium are searched using a means provided in the replay appliance, using which means the data stream read from the recording medium is analyzed to find a navigation sector designator. If such a designator is
35   found, a statement about the present replay time contained in the navigation sector information is evaluated and is compared with a predetermined playing time from which it is intended to replay information stored on the recording medium. As a result of the

comparison, a determination is made as to whether a point corresponding to the desired playing duration is located on the recording medium before or after the point at which the navigation sector designator and the

5   replay time contained in the navigation sector information were found. The recording medium is then scanned at a point corresponding to the determined direction, and the process is repeated until the desired start position or a predetermined start region

10   for replaying is found.

Thus, using a replay appliance for recording media containing information blocks, this allows access, at a defined playing time, to video information on a DVD in

15   an advantageous manner, likewise using a binary search, when said DVD has no DVD Video Title Set Time Map Table or a DVD Video Title Set Time Map Table which cannot be evaluated. In this case, the term binary search covers the comparison of information read from the recording

20   medium which matches a binary word that characterizes the designator, and the evaluation of binary information which is contained in one of the files which are identified by the designator.

25   The invention will be explained in more detail in the following text with reference to a drawing.

BRIEF DESCRIPTION OF THE DRAWING

30   The figure shows an exemplary embodiment for access, at a defined playing time, to video information on a DVD even without a DVD Video Title Set Time Map Table being recorded on the disc.

35   DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS
Since no time code corresponding to the CD Audio is available, owing to the breakdown and interleaving of the information stored in information blocks, for access, at a defined playing time, to video

information, it must initially be assumed that it is
impossible to replay, at a defined playing time, a
recording medium having information blocks when there
is no DVD Video Title Set Time Map Table or the DVD
5   Video Title Set Time Map Table is damaged.

Corresponding to the invention, the replay appliance
contains a search means for finding a designator, which
in this case is a navigation sector designator that is
10 also referred to as NV_PCK ID. The search means is
preferably a mask, which corresponds to the binary word
of the navigation sector designator and is used to find
the navigation sector designator in the data stream
read from the recording medium. The method for finding
15 the navigation sector designator using a mask
corresponding to the binary word of the navigation
sector designator may be either an iterative
approximation method, as is illustrated in the figure,
or else other search methods, for example a continuous
20 search in the forward or reverse direction, or a search
starting from an estimated value. In order to replay,
at a defined playing time, a recording medium having
information blocks, using the iterative approximation
method, the recording medium is first of all scanned,
25 in a first step S1, at a position which corresponds
approximately to the center of the recording medium.
This physical point on the recording medium will,
however, as a rule not correspond to half the replay
duration of an item of video information (called a
30 video object VO) on the disc, since the replay duration
and the physical point on the disc are not proportional
owing to the data and recording structure. Furthermore,
the amount of data required for replaying depends on
the nature of the video object VO, since, as a rule,
35 the only information recorded is that which relates to
changes from one frame to the following frame. A very
wide tolerance can therefore be allowed for the first
point on the recording medium that is to be driven to
by a scanning device in the replay appliance.

From the point on the recording medium, which the
scanning device of the replay appliance jumps to, the
information recorded there is then read and is compared
5   with a mask that corresponds to the binary word of the
navigation sector designator. As soon as a navigation
sector   designator   has   been   detected,   information
contained in the navigation sector information, which
is also called the navigation packet NV-PCK, is then
10 evaluated relating to a replay time which corresponds
to the playing time from the start if the video
information were replayed continuously. The means
required to evaluate this replay time, which is also
called the playback time PGC, are already provided in
15 the replay appliance for continuously replaying video
information, so that there is no need for any further
explanation relating to this. A relationship between
the recording point and the replay time is then
produced by a binary search carried out in this way and
20 is used to approach a point on the recording medium
which must be found and scanned for replaying at a
defined playing time, even without a DVD Video Title
Set Time Map Table. By comparing the replay time
determined at the scanning point with the time from
25 which replaying at a defined playing time is intended
to take place, that point is then defined at which the
recording medium must be scanned in a second step S2
unless a match has already been found. In the example
shown in the figure, the aim is to replay, with a
30 defined playing time, from a playing time which is
located before the determined position, so that the
recording medium is scanned by the scanning device in
this second step S2 at a point which is also physically
located before the point on the recording medium that
35 was scanned in the first step S1. This second point may
also be an arbitrary point in the region before the
point scanned in the first step S1. However, it is also
possible to determine the time difference between the
replay time determined in the first step S1 and the

desired playing time, and to define a jump distance corresponding to the result.

A binary search is then carried out once again at the
5   second point, which results in a determination being made as to whether a point to be sought for replay at a defined playing time is located before or after the present scanning position. If the replay time determined in the second step S2 is not so far away
10   from the desired playing time, a third point on the recording medium is scanned, depending on the result of the comparison, in a third step S3. In accordance with the figure, a replay time was determined in the step S2 which is located before the desired playing time, so
15   that the scanning device of the replay appliance is driven, in a third step S3, to a point on the recording medium which is located after the point on the recording medium scanned in the second step S2 and before the point on the recording medium scanned in the
20   first step S1. Using an iterative approximation method, a point on the recording medium which corresponds to a desired playing time is thus found even without a DVD Video Title Set Time Map Table, and the process of replaying starts at a defined playing time in the
25   fourth step S4.

To reduce the number of steps to be carried out in order to determine the scanning point on the recording medium corresponding to replaying at a defined playing
30   time, it is possible to use a tolerance window, which starts the replay process at a distance from a predetermined playing time.
The invention is intended for use in a replay appliance for recording media containing information blocks,
35   having means for access, at a defined playing time, to video information on a Digital Versatile Disc, called a DVD, even without a so-called DVD Video Title Set Time Map Table, and can in general be used for access, at a defined playing time, to information on a recording

medium where there is no proportionality between the recording point and the replay time and no concordance list is available defining the relationship between the replay time and the recording point.